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Social aspects of mobile work:
A framework for further research and design

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Abstract

We report ongoing research in search of characteristics of mobile work and use of mobile ICT (information and communication technologies) to support such work. Based on an empirical investigation of the work of mobile service technicians at Telia Nära, we outline five areas of social interaction where mobility changes fundamental aspects of the work.

Introduction

The recent technical development has made it possible to work while being on the move. Wide dissemination of mobile phones, increased capacity of computer networks, integration between telephony and computer systems are factors that work together to facilitate mobile work Many claim the availability of information that this technical development has brought about has made any place central. There seems to be some reason for doubt, however. Having access to information may not be the only factor. Interaction with others may be another important point of concern, for several reasons.

So far, most studies of mobile work concern the technology such as mobile networks, RPC (Remote Procedure Call), ATM, Satellite systems etc. This paper reports a part of an ongoing empirical research project at Telia Nära in search of characteristics of mobile work and ICT use to support such work.

We below outline five areas where mobility changes fundamental aspects of the social interaction. We present those problem areas as the start of a discussion on general framework for further research within the field of mobile computing which we find largely lacking as yet.

Mobile Work at Telia Nära

Telia Nära is part of Telia, the government owned telephone operator in Sweden. Telia Nära is divided into 35 market companies each containing the three divisions; (1), Service, with Service technicians serving the telephone network (2), Support, a call centre, and, (3) The Store. This project has focused on the part of Telia Nära in Umeå, Sweden, providing service to Telia's customers, e.g. part one. The service technicians fix problems like cable breakdowns, overhearing on the lines, etc. The study of mobile workers 'in the wild' was done through close observations and interviews. The service section has recently gone through a reorganisation including providing the technicians with advanced computer and telephony technology, and introducing a new economic incentives system. The new ICT makes the technicians completely mobile; any information they need can be accessed from the car. Similarly, anybody who wants to pass information to them, by telephone or computer, can reach them in their cars. The goals of the reorganisation have been to create closer customer relations, JIT (just in time) delivery of parts and services, and three route minimisation by use of mobile ICT.

The ICT at Telia Nära can be divided into three different but fully integrated systems. (1) The Car systems with terminals at all times connected to the Service call centre downtown over a radio LAN. The cars have systems to support scheduling of activities, putting work on waiting lists, searching the telephone network for errors, getting in contact with the other cars, redirecting missions to free cars if something unexpected occurs, etc. The technicians can, for example, search for errors over the telephone network from the customer's site. The new ICT also makes it possible to plan the route for the day at home and reschedule it during the day. It can also be used to order parts needed to be changed at the customers site and plan a route for the day in a optimal manner. (2) The cellular phones receiving SMS (short message service) -messages from the central station downtown, telling of breakdowns in the telephone network. The SMS message contains information of the customers telephone number, so the technician knows where the customer is located. It also contains information about what kind of problem there is from the description given by the client. The SMS-system is connected to the mobile car system, so the short description using SMS given over the cellular phones can be further

investigated by consulting the car system, and (3) The Station systems needed to receive calls from phone customers needed help, scheduling of those, and resource allocation among the cars, i.e. where to send which car.

Being mobile at work is crucial for the technician's ordinary work from the way they plan the route for the day or scheduling a whole week to carry out specific service activities at a customer's site.

However, the technicians need to deal with many other problems related to the mobile nature of their work. We have identified five areas of socially related problems concerning making a work site function smoothly. The problems are related to, or affect, both the quality of work, the efficiency of the route planning, and social aspects of the work situation.

Five Problem Areas of Mobile Work

Work is a social activity. Not only is co-operation often necessary to accomplish tasks, but work is also a part of people's life. People work not only for money. People do socialise at work, and would be expected to want to find ways to do so even if their work includes a lot of travelling alone. Based on the findings of our case study, in this section we outline five problem areas of mobile work including social aspects. The areas include social aspects of work concerning the individual as a professional as well as a social being. The professional aspect includes sharing knowledge, explicit as well as tacit, forming a professional identity, and maintaining a professional ethics. The social aspect includes becoming a member of a social group, and maintaining the community.

1. Becoming a member of a group

Dahlbom, (1998) describes a trend in the new information society towards a higher degree of "nomadicity", e.g. by the use of new information technology being able to move around and work wherever we are independent of time and space. However, not even nomads are eremites. They live in groups, they are social, both in work and for pleasure.

Today's mobile workers are of the first generation. They have learned their work in a group, and they have moved towards mobility and separation. Perhaps the next generation mobile workers will be born into mobility. On their first day at work, they will be put in a car alone. In the case of Telia, they cannot bring a tutor along even if they wanted to and the company found it worthwhile; the second seat in the car is occupied by the computer equipment. The newcomer is left with the initiative; this is not the way introduction to social groups typically works. The "horde formation" activities must probably have some support also in a mobile environment.

2. Co-operation and knowledge sharing at a distance

In the area of CSCW, co-operative work has often been defined as the relationships among the agents formed through planned structuring, deliberate discursive action, as opposed to spontaneous linking, such as in a market (Lyytinen & Ngwenyama, 1992).

However, the study of the service technicians at Telia Nära shows that there is a need of new ways of defining mobile co-operation. Mobile workers often work alone, compared to teleworkers who often work in remote offices and thus have their colleagues around them, and co-operation is seldom characterised by two or more people working on the same task. Rather, mobile work is a matter of co-ordination of activities, formal and informal meetings, and is very much structured as a market place. Thus, even if mobility implies some place independence the current place is often of importance.The mobile work is remote, decentralised, moving and highly individual rather then stationary, centralised and co-located like telework. One issue is then, how to maintain and develop professional knowledge when on the road all the time.

3. Process optimisation vs. isolation and control

The mobility among the Telia Nära technicians was introduced in order to reduce mileage; people should not have to go to the Station at all, and tasks should be assigned so as to reduce transportation. The new system led to a feeling of being alone and left out among the technicians. When working together, there was a feeling of being part of the team. The new system means people mostly work alone, sharing experiences and communicating on how to deal with upcoming problem situations over the phone.

So, while solving the problem of optimising work by letting the service technician take a larger responsibility, another problem seems to have been created. The mobile worker runs into problems of getting a feeling of working together with the rest of the group.

There is also a measure of control. The economic incentive system for the technicians gives a premium to he who makes the highest number of repairs. There seems to be some contradictions between optimising processes and maintaining work satisfaction. While this is nothing new, the nature of mobile work seems to call for new remedies.

4. Customer service

The explicit goal at Telia Nära is to create a more customer centred organisation. This is to be achieved by making it possible for a service technician to solve a problem completely during one single visit at the customers' site without having to go back to the central Station downtown for checking a cable, etc. To achieve this, a specification of materials needed must be complete, and material must be readily available.

As for the first point, there is no systems support for checking in advance the problem at the customer's site. The success entirely depends on the ability of the person at the Station to determine this during the telephone contact with the customer. As for the second point, one feature of the reorganisation is the abolishment of local storehouses, leaving any material that is not regularly carried around in the cars a matter of ordering from a supplier. This means at least one day of delivery time in the case the supplier is not local. A third aspect of customer service is the competence basis of the serviceman. Even though there is a minimum of knowledge shared by all, inevitably some people become more of specialists in a certain field of expertise, or in the situation of a certain customer. Maybe the mileage minimisation principle should be complemented by the "right man at the right place" principle? e.g. there are some needs to develop systems and routines for mobile knowledge management.

Here, the location dependence of the customer is a great determinating factor that effects what kind of service that can be given by the mobile workers.

5. How to maintain a community?

There are many reasons for maintaining a sense of community among the staff. Common values are necessary for an ethically sound professional conduct. Corporate image may prescribe a common way of approaching customers. Quality demands may be dependent on the ability, and willingness, among people to share knowledge, tips, and promote quality standards. A general feeling of community among people may create a positive internal climate; "We, Telia".

Before the reorganisation, the technicians met regularly at the Station. They went there to receive new orders, but at the same time the met other technicians, the Station staff, had a coffee and a chat. Now, they receive their orders at home in the morning. They go directly to the customers, and the idea is to minimise the mileage. However, it appears people use the phone to arrange meetings; "Can we meet at… for a coffee at 10.30?" Some time is spent on such organising of social events. It appears "mileage minimising" has a competitor: "social interaction optimising".

Common standards are enforced and re-shaped by social interaction. One might wonder whether this quality of the interaction could be maintained by using mobile technology. This mobile community shows similarities with teleworking communities. However, one thing that distinguishes the mobile communities from the teleworking communities is the lack of the location awareness of the colleuges. When working on a distance the remote worker always know where the collegues are. To create a similar awareness of the others in a mobile settings requires some kind of awareness technologies.

Conclusions

We found five areas, where the technology alone cannot help. We suggest those areas must be more researched in order to assess the dignity of the problems. As described above all those five areas concerns mobile work in the sense of carrying out the work while being on the move which thus differentiates mobile work from distributed or co-located telework.

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